IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Roger G. L. Wheatcroft
TITLE: ROTARY THERMOCYCLING APPARATUS : ATTY DKT: P-1699-1
PARENT CASE ART UNIT: 1744
PARENT CASE EXAMINER: D.A. Redding

PRELIMINARY AMENDMENT

Box Patent Application February 27, 2002
Assistant Commissioner for Patents
Washington, DC 20231

Dear Sir:

Please amend the above-captioned divisional application, submitted concurrently herewith, as follows.

In The Specification

At page 1, between the title "ROTARY THERMOCYCLING APPARATUS" and line 5, add the following paragraph.

This application is a divisional application of Serial Number 09/876,428, filed on June 6, 2001 in the name of Roger George Laurence Wheatcroft and entitled "Rotary Thermocycling Apparatus", now U.S. Patent _____, which in turn is a continuation of Patent Cooperation Treaty PCT/CA99/01035, filed on November 2, 1999, and claiming priority of Canadian patent application CA 2,255,850 filed on December 7, 1998.

At page 4, starting at line 1, add the following paragraph.

EP 0 723 812 describes a thermal cycling reaction apparatus having a reactor with a reactor body made of a thin heat conductive plate and having a cavity as reaction chamber.

At page 4, lines 6-9, replace subparagraph (a) with the following.

(a) a plurality of stations for receiving samples in a flat-bottomed container, each station having a flat heated plate on which said container is placed and having means to independently control said heated plate at a pre-determined temperature;

At page 4, lines 12-15, replace subparagraphs (c) and (d) with the following.

(c) at least two of said stations having a heating unit adapted to be lowered over a container located on said station, each heating unit being comprised of a section with a flat lower surface that is adapted to be lowered into said container close to but not in contact with the sample in said container; and

(d) at least one station, in addition to the stations of (c), having a spray unit adapted to spray a liquid reagent(s) into a container located at said one station.

At page 5, lines 14-17, replace subparagraphs (c) and (d) with the following.

(c) spraying said sample with at least one liquid reagent;

(d) controlling (i) the temperature at each station, (ii) the dwell time in each station, (iii) the duration and timing of the spray(s), and (iv) the number of sequential cycles for the biochemical reaction, said controlling of the temperature is at at least two stations and includes the step of lowering a heating unit over the containers at said at least two stations, each heating unit being comprised of a section with a flat lower surface that is adapted to be lowered into said container close to but not in contact with the sample in said container.

At page 16, line 30 to page 17, line 3, replace the paragraph with the following.

The heating units of stations 5 and 6 have an important effect on the rate at which the sample reaches the required temperature, by reducing the depth of space that has to be heated. Thus, the volume to be heated extends from the cover to the base of the dish, which is simultaneously being heated from below. In the present invention, that volume is small.

Add a new page containing an abstract, per the attached new page 23.

In The Claims

Cancel claims 1-29 and substitute therefor the following claims 30-34.

30. (New) A rotary thermocycling apparatus especially for biochemical reactions, comprising:

(a) a plurality of stations for heating biochemical samples in a flat-bottomed container at predetermined temperatures;

(b) means to move each said flat-bottomed container from one station to another station in a pre-determined sequence; and

(c) at least one station having a spray unit adapted to spray liquid reagent(s) into a container located at said one station.

31. (New) A method for a sequential biochemical reaction at different temperatures, comprising placing a biochemical sample in a flat bottom-container and sequentially cycling said biochemical sample through predetermined changes in temperature by heating said container on a sequence of flat heated plates for a predetermined period of time.

32. (New) The method of Claim 31 in which the sample is on a filter having an underpad of absorbed salts.

33. (New) A method for a sequential biochemical reaction at different temperatures, comprising placing a biochemical sample on a filter or membrane and sequentially cycling said biochemical sample through predetermined changes in temperature, at least one step in the sequence involving spraying the sample with at least one liquid reagent.

34. (New) The method of Claim 33 in which the sample is on a filter having an underpad of absorbed salts.

REMARKS

Claims 1-29, some of which included improper multiple dependencies, are canceled and replaced by new claims 30-34, which were divided from parent application serial number

09/876,428. Amendments have been made to the specification to more precisely describe certain aspects of the invention, and an abstract has been added.

Respectfully submitted,

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MARKED-UP COPY OF AMENDMENTS TO SPECIFICATION

(Deletions are shown by brackets, additions are underlined.)

At page 1, between the title "ROTARY THERMOCYCLING APPARATUS" and line 5, add the following paragraph.

This application is a divisional application of Serial Number 09/876,428, filed on June 6, 2001 in the name of Roger George Laurence Wheatcroft and entitled "Rotary Thermocycling Apparatus", now U.S. Patent _____, which in turn is a continuation of Patent Cooperation Treaty PCT/CA99/01035, filed on November 2, 1999, and claiming priority of Canadian patent application CA 2,255,850 filed on December 7, 1998.

Page 4, line 1.

EP 0 723 812 describes a thermal cycling reaction apparatus having a reactor with a reactor body made of a thin heat conductive plate and having a cavity as reaction chamber.

Page 4, lines 6-9, subparagraph (a).

(a) a plurality of stations [and especially at least four stations] for receiving samples in a flat-bottomed container, each station having a flat heated plate on which said container is placed and having means to independently control said heated plate at a pre-determined temperature;

Page 4, lines 12-15, subparagraphs (c) and (d).

(c) at least two of said stations having a heating unit adapted to be lowered over a container located on said station, each heating unit being comprised of a section with a flat lower surface that is adapted to be lowered into said container close to but not in contact with the sample in said container; and

(d) at least one station, in addition to the stations of (c), having a spray unit adapted to spray a liquid reagent(s) into a container located at said one station.

Page 5, lines 14-17, subparagraphs (c) and (d).

(c) [optionally] spraying said sample with at least one liquid reagent;

(d) controlling [at least] (i) the temperature at each station, (ii) the dwell time in each station, (iii) the duration and timing of the spray(s), and (iv) the number of sequential cycles for the biochemical reaction, said controlling of the temperature is at at least two stations and includes the step of lowering a heating unit over the containers at said at least two stations, each heating unit being comprised of a section with a flat lower surface that is adapted to be lowered into said container close to but not in contact with the sample in said container.

Page 16, line 30 to page 17, line 3.

The heating units of stations [five] 5 and [six] 6 have an important effect on the rate at which the sample reaches the required temperature, by reducing the depth of space that has to be heated. Thus, the volume to be heated extends from the cover to the base of the dish, which is simultaneously being heated from below. In the present invention, that volume is small.

ABSTRACT

A method for carrying out sequential reactions, e.g., sequential biochemical reactions, and a rotary thermocycling apparatus especially adapted for conducting such reactions, for example, polymerase chain reactions, are disclosed. The apparatus comprises a plurality of stations, e.g., four stations, for receiving biochemical samples in flat-bottomed containers. Heating means are provided to independently control the temperature of each station, transport means are provided to move the containers from one station to another in a predetermined sequence, and at least one station has a spray unit to spray liquid reagents into a container at that station. The method includes sequentially cycling a sample through predetermined temperature changes and spraying the sample with at least one reagent.